

January 9, 2002

MODIS sensor Working Group (MsWG) Summary

Attendance: Aisheng Wu, Bill Barnes, Stuart Biggar, Vincent Chang, Roger Drake, Bob Evans, Chris Moeller, Gary Toller, Jack Xiong, Eric Vermote, Zhengming Wan, Joe Esposito

Scheduled Items

Item 1. Jack Xiong - Discussions on RSB m1 trending and optics degradation related issues. Use materials prepared for the MST meeting (file: PFM_WKSP_P2.pdf).

- a) Empirical Vignetting Function (Part 2, PFM charts)
Trending of PFM measured m_1 depicts deviation from the linear m_1 curves adopted for the consistent year. The deviation is band dependent and suggests a beta angle dependency. MCST has analyzed the m_1 screen-open to screen-closed ratio of each calibration for bands 3, 4, 17, 18, and 19. The trend of the m_1 ratio is consistent across detectors and, on average, across the bands. The average across all detectors and five bands is applied as a correction to the ocean bands m_1 values. The trend of the resulting ocean bands m_1 are very close to linear (.2%) with a slight offset to the current values.
- b) Scan Mirror Trending
Trending of the m_1 indicates a degradation of the scan mirror that is at a different rate for each mirror side. However, the SD is at one, large, AOI centered at 50.25°. Other OBC can be used to measure the degradation (e.g. lunar observations through the SV port, SRCA)
Lunar measurements, corrected for libration, Earth-sun distance, over-sampling, etc, have been analyzed (AOI = 10.875°). The degradation of the scan mirror is confirmed but the rate of degradation is larger than for the SD.
SRCA data (AOI = 38.25°) also confirms the scan mirror degradation but the rate of degradation lies between the SD and the Lunar degradation rates. This suggests that the RVS of PFM is changing as a function of time and AOI.
EV) Do we understand the (physical) cause.
JX) Contrary to simple expectations, a larger AOI angle produces a smaller effect.
Let us turn to EV data (MISR v MODIS)
Analyze the data to get relative value per mirror side at AOI of SD, SRCA, and SV (Lunar). The trend of these results is consistent with the results from the three scan mirror calibration methods.
Lunar trend implies RVS change is flattening out. This is consistent with SD and SRCA.
This analysis implies that the RVS change is a function of time and AOI
BB) VS has stated that reprocessing is to be done to level 2 and not to level 1. If we want to bring this into the downstream analysis, we must apply this to level 1.
JX) We can use MISR or EV analysis but this yields a relative result (< 2% for B9, < 5% for B8). It may be possible to get an absolute normalization from MISR
BB) How much of the mirror RVS is currently not corrected?
JX) As much as 10% (B8) is not being corrected in L1B.
BE) Miami looks at the water leaving radiance to get a cross scan correction. This has not been done with RVS dependent upon time and AOI together.

- BB) Will this affect the Miami analysis?
BE) We need to understand how the aggregate is trending.
BB) When we re-process the ocean bands, should a correction be applied at L1B to fix the RVS as a function of time and AOI?
BE) Miami needs to look at the cross scan with MOBY to get a feel for this effect.
-

Around the Table

Participant: Bill Barnes – Thuillier 2001 v MCST solar Irradiance Spectrum
Thuillier 2001 v MCST(Thuillier 1997) has a 1.77% offset. This offset will affect the conversion from reflectance to radiance. We want to use same spectrum as other instruments.

Participant: Vermote - For non- B7: MCST should come up with a detector to detector correction.
CM) Coefficients vary on the order of 1% => relatively constant to 1% corrected (~ 90% of optical x-talk (B5 into B26))

Participant: Evans – Ed is working on cross scan and other corrections. From the discussions today, we will need roughly monthly updates of our coefficients.
BB) You will fold this in and will have to wait until summer for reprocessing.

Participant: Drake – Pre-ship testing is on-going.
BB) There is talk that the pre-launch review will occur at roughly the end of February.
RD) We are looking at a spring launch.
BB) They are more than likely looking at a more gradual slip of schedule.
RD) We also request that MCST send Vdet/Itwk sweep and dn_{SAT} results to SBRS

Participant: Moeller – Does the BB warm up/cool down cycle start at the same time (geo-location, orbit location) each time?
JX) The cycle start should not depend upon geo-location but may start at roughly the same orbital point due to scheduling constraints. The length of the activity should average out orbital effects. There are no obvious trends.
CM) We have been looking at global 1-day data sets for the thermal bands. There is an RVS effect in the LWIR CO₂ band. We are also looking at data from another spacecraft to see if it is consistent => MODIS may have a small RVS (scan mirror) problem in thermal bands.
JX) Comparison of closed NADIR RVS measurements at different times are roughly the same with small changes. MCST can look at the profile (cross scan) to see if the effect is there.
CM) We have compared PFM to FM1 center wavelengths. Is a CWL change of roughly 10% surprising? The centroid of the FWHM is also different (roughly a few percent). Look at B24 and B25.
RD) The value of 10% sounds much too large. SBRS will have Jim Young look at the CWL values from pre-launch.
JX) MCST will investigate this also.